tation formed of a kind of nullipore, combined with pebbles and broken shells, occur in the singular veins of conglomerate traversing the rock.

NOTES

We are glad to hear that Government have consented, though tardily, to give effect to the wishes of the country, by offering to defray the expenses of the funeral of Dr. Livingstone in Westminster Abbey. The *Times* states that a merchant in the city of London, in view of the inability of Dr. Livingstone's family to bear the expense of the ceremonial, had already volunteered to be at the charges of this melancholy tribute of respect, but it obviously would have been unbecoming the dignity of the nation which has been honoured by the achievements of the illustrious traveller for the last honours to have been rendered him at the cost of any private person. The Southampton Town Council has resolved to receive, with fitting honours, the remains of Dr. Livingstone, which are expected to arrive at that port very shortly. The body, it is said, is to lie in state for four days in the Geographical Society's building, Saville Row.

At an influential meeting held at Edinburgh on Monday, it was resolved to extend on a large scale the University buildings and to remodel those already existing, so as to suit them to modern requirements. We are glad to notice that the importance of Science in University teaching was insisted on at the meeting, and we hope that in the extended and remodelled University scientific teaching and research will be accorded a prominent place. Of the 100,000*l.* required, 55,000*l.* have been already subscribed. The Right Hon. Lyon Playfair, M.P., gave an able address, in which he said,—A student's life should not be that of a bookworm. Discovery as well as instruction in Science forms the glory of a Professor, and infuses a new life into the pupil who comes under its influence. Our efforts in the extended organisation which we now ask for this University should be to provide means for investigation in Science, as well as its mere teaching. Of all things in the world nothing is so dismal or so useless as to connect Science with mere verbalism, and to try to teach it out of a book as you would a page of Livy or Homer.

The French Government have only done an act of justice in conferring a pension of 12,000 francs upon M. Pasteur in consideration of his services to science and industry.

Colonel Stuart Wortley has been appointed by the Commissioners of Patents to the Curatorship of the Patent Museum at South Kensington, vacant by the death of Sir Francis Pettit Smith.

Signor Augusto Righi has been appointed Professor of Natural Philosophy in the Instituto Technica Reale of Bologna.

The Council of the Society of Arts has decided to offer a prize, consisting of a gold medal or 20 guineas, for the best essay "On the Cultivation and Manufacture of Indian Teas."

A meeting of the local general committee of the British Association was held in the rooms of the Chamber of Commerce Bradford Exchange, on March 31, to receive a report as to the reception fund. It appeared that the total receipts were 3,248*l.* 16*s.* 8*d.*, and the expenditure 3,097*l.* 7*s.* 2*d.*, leaving a balance of 155*l.* 9*s.* 6*d.* in the bank, subject to the expenses connected with the winding up of the committee's duties. It was agreed that the balance remain in the hands of the local executive committee until all expenses are paid, and that the amount which may remain be given to the Bradford Philosophical Society, an institution having an object kindred to that of the British Association.

M. Leverrier has been appointed president of the section of Science at the meeting of the Delegates of Learned Societies, which will be held at Sorbonne.

From the sixth quarterly report on the Sub-Wealden Exploration we learn that during the last two months a depth of 359 ft. has been bored, making a total of 671 ft. The borings are still in the Kimmeridge clay. In this deposit indications of petroleum have been noticed, and at depths of from 600 ft. to 650 ft. it was particularly observable. Occasional veins of carbonate of lime have been met with crossing the cores obliquely, but the report states that all the beds yet passed through are horizontal. One of the most important results of the exploration has been the discovery of gypsum and other beds which are likely to prove commercially productive. Attached to the report is a list of the fossils which have been found. The committee report that they have sufficient funds to continue the work to a depth of 1,000 ft., and should it be deemed desirable to go beyond that depth, a conference will be held to consider the question before soliciting further contributions. The present balance in hand is 576*l.* 4*s.* 4*d.*

It is said MM. Croce Spinelli and Sivel will be awarded a prize for their last aeronautical ascent, in which they took with them oxygenised air.

Another aeronautical ascent took place on Thursday week from Lavillette gasworks in a new balloon called "Michel le Brave," which is to be sent to Roumania. The measurement is 1,500 cubic metres. It was sent up with six persons and descended at Vic-sur-Aisne in a regular storm; large trees were uprooted, but no bodily harm was received by the balloonists. It is intended to have several other ascents next spring.

The greatest alarm has been caused in North Carolina and Tennessee by the appearance of what seems to be volcanic phenomena in the former of these states. The scene of the reported disturbance is Bald Mountain, in the south-western part of M'Dowell County. Rumblings were heard during several days, apparently coming from the interior of the mountain, and one letter, dated March 20, states that near the summit of the peak an area of nearly an acre was agitated by subterranean upheavals, and from which smoke and vapour issued. The people of the surrounding district are reported as being in the greatest consternation, ceasing from work and living in common, and evidently quite expecting that the final catastrophe is impending.

Seismic commotions of some magnitude have been felt in Algeria, at Algiers, and surrounding places. The centre of commotion seems to have been somewhere in the vicinity of Cherchel, where the barracks have suffered much. The first shock was felt on March 28 at 11.10 A.M.

An Alpine club has been established in Paris under the presidency of M. de Billy. The rules will be similar to those of English, Swiss, Italian, and Austrian Alpine clubs. It is intended to issue a periodical containing the papers read before the Association. More than 100 members have been enrolled.

The sittings of the Bureau des Longitudes are now being held at the Collége de France.

The Mexican Axolotls, which have for some time been exhibited in one of the handsome vases in the entrance-hall of the Brighton Aquarium, spawned about a month ago. As the parents showed some disposition to devour their eggs, the latter were removed to one of the troughs of the salmon-hatching apparatus, where the young axolotls may now be seen, having just been hatched after a period of 29 days in the egg.

A SUPPLEMENTARY credit of 4,000*l.* has been voted by the Versailles National Assembly for paying a part of the expenses incurred by the observation of the Transit of Venus. Six members belonging to the ultra-clerical party have given a negative vote on a division. It is said they are not believers in the Copernican theory, and have no faith in the astronomical observations.

THE Rev. Henry Moule, after a series of experiments extending over twenty years, has devised a process of manufacturing an illuminating gas from Kimmeridge clay.

THE educational means of Harvard University have recently been increased by the addition of an institution which will make that University one of the most complete in the United States. This Institution is known as the "Bussey Institution," after Mr. Benjamin Bussey of Roxbury, Mass., who about thirty years ago left to the University a magnificent sum of money and a small estate for the purpose of promoting the scientific study of agriculture and horticulture. The money was allowed to accumulate for many years, and has since been increased by 100,000 dollars left by Mr. James Arnold, Merchant, of New Bedford. The estate has been to some extent laid out for the purpose intended, and several suitable buildings, including a laboratory, have been erected, and the Harvard authorities have devised a course of instruction and investigation on a broad and thoroughly scientific basis. The appointments already made include:—An instructor in Farming, a professor of Agricultural Chemistry, a professor of Horticulture, a professor of Applied Zoology, an instructor in Entomology, a director of the Arnold Arboretum, and a librarian and curator of Collections. The institution is intended both for instruction and investigation, though we are glad to see that students' fees are not necessary to the support of the institution. The permanent funds provided by Mr. Bussey will enable the President and Fellows to maintain the Institution as a scientific station, like the Astronomical Observatory or the Museum of Comparative Zoology at Harvard College, until the time shall come when there shall be a demand for its privileges as a school. The experiments and investigations made at the Bussey Institution will be published from time to time in a Bulletin, the first number of which is before us. It contains four papers by F. H. Storer, professor of Agricultural Chemistry in Harvard University, one containing analyses of some commercial fertilisers, another of American "shorts" and "middlings," a third On the Agricultural Value of the Ashes of Anthracite, and a fourth containing a Record of Trials of various Fertilisers on the ground of the Bussey Institution. The only other paper is a useful one by Dr. Slade, professor of Applied Zoology, On the Humane Destruction of Animals.

THE French Society of Geography, we learn from *La Nature*, has just received news of a French expedition which has been exploring Terra del Fuego. On December 7, last year, the expedition landed on the coast of that island, and proceeded into the interior. The explorers found a large lake of 25 kilomètres in circumference, surrounded by luxuriant vegetation, and literally covered by an army of wild fowl, among which the most abundant were ducks and geese. These regions are inhabited by rude but hospitable tribes; the women especially are very affable and obliging. One of them, in exchange for some pieces of sugar and common handkerchiefs, gave the leader of the expedition an object to which she attached an immense value, and which she preserved as a relic,—the lid of a sardine box.

WITH a view of properly exhibiting the geological and metallurgical resources of America at the forthcoming exposition at Philadelphia, an association has been organised, embracing such names as those of Prof. Leslie, Prof. Genth, Prof. Raymond, Prof. Wyman, Prof. T. Sterry Hunt, George H. Cook, and others, to whom is to be intrusted by the Board of Centennial Commissioners the duty of collecting whatever will best answer the purpose in question.

THE Paris Jardin d'Acclimatation has succeeded in "breaking-in" some zebras so far as to induce them quietly to draw a carriage, and one permits children to ride round the gardens on its back.

DR. HAYDEN, the head of the Geological and Geographical Survey of the U.S. Territories, has commenced the publication of a bulletin to communicate such announcements of new facts made by any member of his party as it is desirable to bring promptly to the notice of the scientific community in advance of their publication in his reports. The first number of this Bulletin, bearing date January 21, is occupied by a list of the members and collaborators of the survey for 1873, and a list of the publications, from which we learn that six volumes of the reports have appeared from 1867 to 1873, and that seven volumes of miscellaneous publications will be published in octavo form, the most elaborate being the hand-book of the Ornithology of the Northwestern Territories, by Dr. Coues. Several quarto volumes will also be sent out, of which there have been actually published one by Prof. Leidy, on the extinct vertebrata of the Western formations, and one on the Acrididæ of North America, by Prof. Cyrus Thomas. This quarto series, it is expected, will include ten volumes, among them memoirs on the vertebrata of the cretaceous and Tertiary formations, by Prof. Cope; one each, on the fossil plants, by Prof. Newberry and Prof. Lesquereux; on the fossil invertebrates, by Prof. Meek; and the volume on general geology, by Prof. Hayden. Thirteen maps have been published for the survey, those of the Yellowstone region being especially valuable. The body of the bulletin is occupied by a report on the stratigraphy and Pliocene vertebrate palæontology of Northern Colorado, by Prof. Cope, in which he presents the parallelism of the formations recently investigated by him with those earlier known and in other parts of the West. He concludes that, although these formations have generally been considered as Tertiary, the geological evidence shows them to be strictly mesozoic, as in the great lignite formations on the Missouri River. During the past season twenty-one new species of vertebrates were obtained in the Pliocene sandstone at the head of the watershed between the South Platte River and the Lodge-pole Creek.

THE *Belgique Horticole*, for February, publishes a complete list of botanical gardens throughout the world, with the names of their curators and of the professors of botany at the different towns.

THE Science and Art Department has issued a catalogue of apparatus for instruction in geology, mineralogy, animal physiology, elementary botany, general biology, principles of mining, and physical geography.

THE *Brisbane Courier* of December 30, 1873, publishes the following official telegram from Mr. Walter Hill, the Government botanist, dated from Cardwell on the 27th and received by the Queensland Secretary for Lands:—"Since November 20 we have examined the banks of the Mulgrave, Russell, Mossman, Daintree, and Hull Rivers, and have been more or less successful in finding suitable land for sugar and other tropical and semi-tropical productions. The ascent of the summit of Bellenden Kerr was successfully made by Johnstone, Hill, and eight troopers. At 2,500 ft. in height we observed an undescribed tree with crimson flowers, which excels the *Poinciana regia*, *Colvillia racemosa*, *Lagersstroma regia*, and the *Jacaranda mimosifolia*. At 4,400 ft. a tree-fern, which will excel in grandeur all others of the Alboreous class. A palm-tree at the same height which will rival any of the British-Indian species in gracefulness. On the banks of the Daintree we saw a palm-tree cocoa, which far exceeds the unique specimens in the garden of the same genera from Brazil in grandeur and gracefulness. While cutting a given line on the banks of the river Johnstone for the purpose of examining the land, an enormous fig-tree stood in the way, far exceeding in stoutness and grandeur the renowned forest giants of California and Victoria. Three feet from the ground it measured 150 ft. in circumference; at 55 ft., where it sent forth giant branches, the stem was nearly 80 ft. in circumference. The River Johnstone, within a limited distance of the coast, offers the first and best inducements to sugar cultivation."

WE are glad to observe signs of life in Dundee, says the *Scottish Naturalist*. That town, long noted for its commercial enterprise, has had nearly an equal, but not enviable, celebrity for its poverty and deadness in regard to the study of natural science. But now we trust that that reproach will soon be wiped away, and that the members of the recently founded Dundee Naturalists' Society, a copy of whose constitution is before us, will do good work, and show their fellow-citizens that there are other and more valuable *dona Dei* in the fields, woods, and mountains of the interesting county of Forfar, than that wealth for which the inhabitants of the town of the *donum Dei* are deservedly remarkable. The Society has already upwards of forty members, which number will probably soon be considerably increased. We recommend to the Society the formation of a good local museum of the natural productions of Forfarshire.

IN the forty-first volume of the *Journal of the Asiatic Society of Bengal*, Mr. G. E. Dobson has drawn attention to a particularly interesting feature in the osteology of the Rhinolophine Bats. In the genera *Phyllorhina*, *Triænops* and *Cœlops*, he finds that in the innominate bone the ilium sends forward a process from its upper part, which meets and anchyloses with an extension of the ileo-pectineal spine to form a second foramen above that around which the obturator muscles arise. This peculiarity has not been observed in any other mammal.

THE additions to the Zoological Society's Gardens during the last week include a St. John's Monkey (*Macacus sancti-johannis*) from China, and a Java-Chevrotain (*Tragulus javanicus*) presented by Captain Nutsford; a Macaque Monkey (*Macacus cynomolgus*) from India, presented by Mr. W. Webster; three Passenger Pigeons (*Ectopistes migratorius*) from North America, purchased; an Egyptian Monitor (*Monitor niloticus*) six feet long; and a Tuberculated Lizard (*Iguana tuberculata*) from the West Indies, deposited.

SCIENTIFIC SERIALS

American Journal of Science and Arts, March.—This number commences with an interesting paper, by Prof. Leconte, On the Great Lava Flood of the West, and on the Structure and Age of the Cascade Mountains. The flood, commencing in Middle California in separate streams, became in Northern Oregon and Washington absolutely universal; the whole country, mountain and valley, being buried several thousand feet. Its extent cannot be less than 200,000 to 300,000 square miles; its average thickness is probably 2,000 ft., and extreme thickness 3,700 ft. From the structure of the Cascade Range (which extended throughout the entire region of the flood) and palæontological evidence, the author thinks the flood began to occur during or after the Miocene; and the process of flooding probably continued, by successive fissure-flows of lava, chiefly in the Cascade and Blue Mountain Ranges, until the Post-Tertiary; the liquid matter having been squeezed out by horizontal and vertical pressure, while water, percolating through the hot mass, generated volcanoes that continued the up-building process.—Dr. Blake of San Francisco has a paper On the Connection between Isomorphism, Molecular Weight, and Physiological Action. One of the conclusions arrived at is, that among compounds of the more purely metallic elements, the quantity of substances in the same isomorphous group required to produce analogous changes in living matter, is less as the atomic weight of the electro-positive element increases.—Mr. Carey Lea describes some experiments made to determine whether it is a general law that when a metallic compound reducible by light is placed in contact with an oxidisable body (or one capable of uniting with Cl, Br, or I, as the case may be), the capacity of reduction of the compound by any particular part of the spectrum is influenced by the *colour* of the body placed in contact with it. But he did not succeed in thus generalising Vogel's results; which, however, he does not regard as contradicted or disproved. —Some experiments by Prof. Wright on the oxidation of alcohol and ether by ozone, seem to indicate that the vinegar process might be materially accelerated by passing ozonised air through the apparatus.—Prof. Marsh communicates a notice (bearing on the genealogy of the modern horse) of new equine mammals from the Tertiary formation; and we further note papers On Recent Dredging Operations in the Gulf of St. Lawrence (Mr. Whiteaves); On Fossils figured in the Illinois State Geological Report (Mr. Meek); On Dissociation of certain Compounds at very low Temperatures (Mr. Leeds), &c.

Der Naturforscher, February.—We may first note, in this number, an account of some valuable researches by MM. Pettenkofer and Voit, as to the significance of the carbohydrates in nutrition. The authors conclude that carbohydrates, in the animal system, always pass entirely into carbonic acid and water, and do not produce fat; but they save (*ersparen*) the fat produced from albumen, and this in proportion to the quantities of the albumen-fat and the carbohydrate. There is also, in the biological department, a succinct statement of Prof. Haeckel's "Gastraea" theory.—In geology, some observations by M. G. Laube appear to indicate that the transport of *débris* and stones by ice in East and West Greenland is by no means a common thing; and a note by M. Albert Heim describes and explains the formation of certain huge cauldron-like cavities in solid rock in the Gletschergarten at Lucerne.—From an examination of plant-remains found in amber, Prof. Caspary has inferred that Prussia, in the Amber period, must have been much warmer than now; certain Arctic Ericaceæ, supposed to be of the period, probably flourished on lofty mountains.—M. Merget's recent observations on thermo-diffusion of gas in leaves, and those of M. Reinke on the function of leaf-teeth, are also given; while MM. Fliche and Grandeau study the relation between chemical composition of the ground and vegetation of *Pinus pinaster*. This plant, while a flint-loving species, yet absorbs a considerable quantity of lime; and in soils with much lime, the increased absorption of this salt is accompanied with a decrease in the other ash constituents, especially potash (this being probably the cause of the bad condition of the tree in such soil).—In the department of physics, we have several notes from English sources: On the Elements present in the Sun (Lockyer); On the Affinities of the Magnetic Metals, and On Molecular Phenomena in Glowing Iron (Barrett); On Propagation of Sound in Fog (Reynolds), &c. And in chemistry, there is a note by M. Thomsen, treating of the influence of temperature on chemical phenomena of heat; also a popular summary of M. Ebermayer's researches as to the presence of ozone in the air.—Astronomy is represented by papers on the star shower of November last, and on the direction of the large axes of cometary orbits.

Bulletin de l'Academie Royale de Belgique. No 1, 1874.—In this number M. de Wilde makes some contributions to the theory of bleaching of vegetable fibres which contain incrusting and other matters. He considers that there is substitution of chlorine for hydrogen in the alkaline liquid, which has served to dissolve the incrusting matter, and that chlorine acts, besides, in decomposition of the water, formation of hydrochloric acid, and fixation of oxygen in the organic matter.—The same author communicates notes on the preparation of acetylene, the action of hydrogen on acetylene and ethylene under the influence of platinum black, and the action of the electric effluvia on some gases and gas-mixtures. In the last he confirms MM. Thenard's observations; and acetylene, he finds, is condensed by the effluvia into a liquid which solidifies rapidly, becoming yellow; the solid detonates under the action of heat. Sulphurous anhydride and oxygen combine directly to form sulphuric anhydride.—Continuing his researches on glyceric derivatives, M. Henry describes an octobromide obtained by action of bromine on tetrabromide of dipropargyle; and a paper by M. Spring, describing new syntheses of hyposulphurous acid and of trithionic acid, is of theoretical importance as showing the relations between the sulphates and hyposulphates, and between the latter and trithionates.—